

Interactive comment on “On the role of operational dynamics in biogeochemical efficiency of a soil aquifer treatment system” by Shany Ben Moshe et al.

Anonymous Referee #3

Received and published: 23 October 2019

This article is about experiments on 4 long-columns allowing determining the consequences of application of flooding and drying periods more or less long on the redox potential, oxygenation dynamics and the quality of the outgoing treated water. A comparison of the experimental values obtained with a Soil Aquifer Treatment (SAT) for oxygen was then performed in order to validate or not the behavior observed in the laboratory.

This article is interesting in that studying this type of system in the context of the reuse of treated wastewater is important in a context of water scarcity and reuse in arid and semi-arid regions of the globe. Nevertheless, there are weaknesses in this manuscript

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especially in terms of the description and the precision of the biogeochemical parameters and units. In addition, one of the most important phenomenon, from my point of view, is the issue of SS that is not addressed at all in this article while it is the main problem when applying treated wastewater on a soil (clogging). I recommend major revisions of this manuscript.

General comments

In general English and spelling (words are often singular when they should be plural) should be reviewed for a better reading of the article. Put dots for numbers and not comma (,)

When we talk about dissolved oxygen, it is better to write its unity in mgO₂/L instead of mg/L for better understanding.

Generally, when we talk about nitrogen, concentrations are expressed in mgN/L. Is this the case in this article? For example, Figure 4 shows values but the indicated parameters are NH₄⁺ and NO₃⁻. Is it NH₄-N and NO₃-N?

Specific comments

Introduction

Lines 26-27: the units used for DOC, ammonium and organic nitrogen are not expressed in the system of international units (mg/L)

Lines 40-42: repetition of Goren et al. (2014)

Lines 51-52: repetition of Mienis et al. (2018)

Materials and methods

Line 78: the reference to Table 1 is not good. Table 1 does not refer to sensors and sampling equipment but to the characteristics of the applied water as well as to the duration of the flooding and drying phases.

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Table 1 and Table 2 must be reversed.

Lines 95-97: the sentence should be rewritten to be clearer.

Line 100/Table 1: why call the inflow of experiments 3 and 4 "Real TWW" while additions of glucose and ammonium have been made? If the explanation comes later, put it here.

Table 1: in experiment 3, in the line "inflow" it misses the letter "T" because it is treated wastewater that was added and not raw wastewater.

Line 102: the sentence starting with "During all experiment, ..." should be the beginning of a new paragraph because it concerns ALL the experimentations and not only the experiment 3 and 4. Refer to Table 2. By the way, it lacks an S to "experiment".

Lines 112-114: the first sentence has already been mentioned above (line 100) and the second sentence should be after line 100.

Lines 121: remove the ":" which would indicate a list behind whereas here the different compounds and their methods of determination are separated by dots.

Line 121: why do you write "ammonium" and not NH_4^+ whereas it has already been defined line 85? True for the whole document.

Line 122: it misses the sign "-" behind NO_2 .

Results and discussion

Lines 140-142: repetition of Haaken et al., 2016

Line 169: you say "50 minutes on average for part 1" whereas you said line 132 "80 minutes". Be consistent.

Line 179: 3 digits after the decimal point for the minutes are not necessary (2.7 minutes instead of 2.700 minutes).

Line 186: "around" is not necessary because you write "≈". Moreover, write "for

the 375 cm sensor” and “for the 575 cm sensor” instead of “in the 375 cm sensor” and “in the 575 cm sensor”. Lines 194-195: again, this information has already be written line 100.

Figure 4: it would be better to display the input concentrations on the graphs to better see the differences between input and output for experiments 3 and 4.

Lines 203 and 205: the numbers in the parentheses are the differences between the concentrations measured at the input and those measured at the output for the experiments 3 and 4? I think that it is not wise to express the efficient removal in terms of differences in concentrations but you should rather express these removal efficiencies in terms of percentage.

Line 203: you say that your measurements correspond to what is measured in the full scale SAT site but we have no table, figure, or at least a reference on which your statement is based.

Line 253: Table 1 should be Table 2.

Summary and conclusions

Line 280: 150 minutes or 240 minutes (and not only 240 m which means meter).

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2019-371/hess-2019-371-RC3-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-371>, 2019.

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